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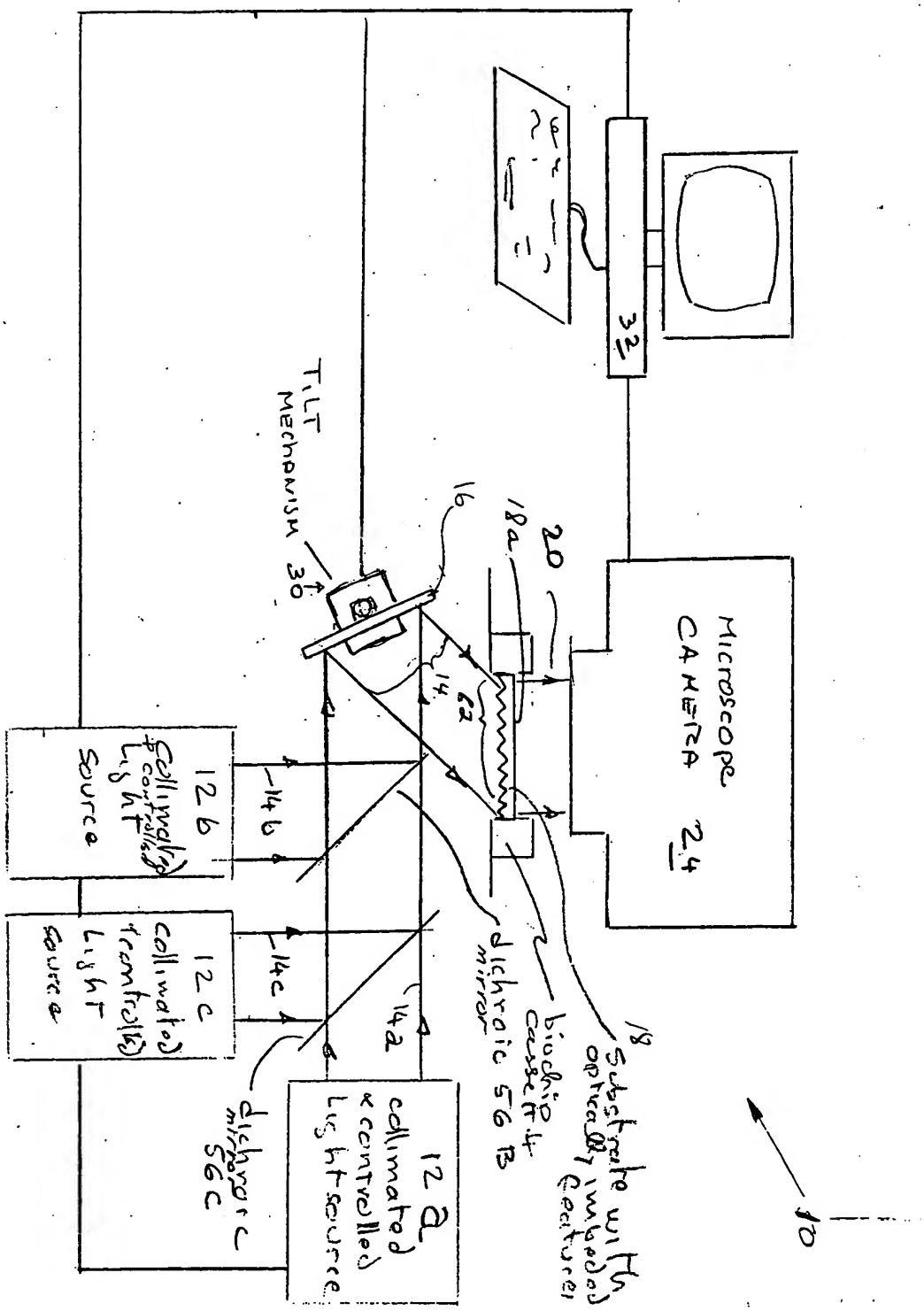

32
MICROSCOPE CAMERA 24
TILT MECHANISM 30
16
18a
20
22
14
12b collimated & controlled Light Source
12c collimated & controlled Light Source
12a collimated & controlled Light source
14b
14c
14a
dichroic mirror 56c
dichroic mirror 56b
substrate with optically imbedded features 18
10

FIG 1

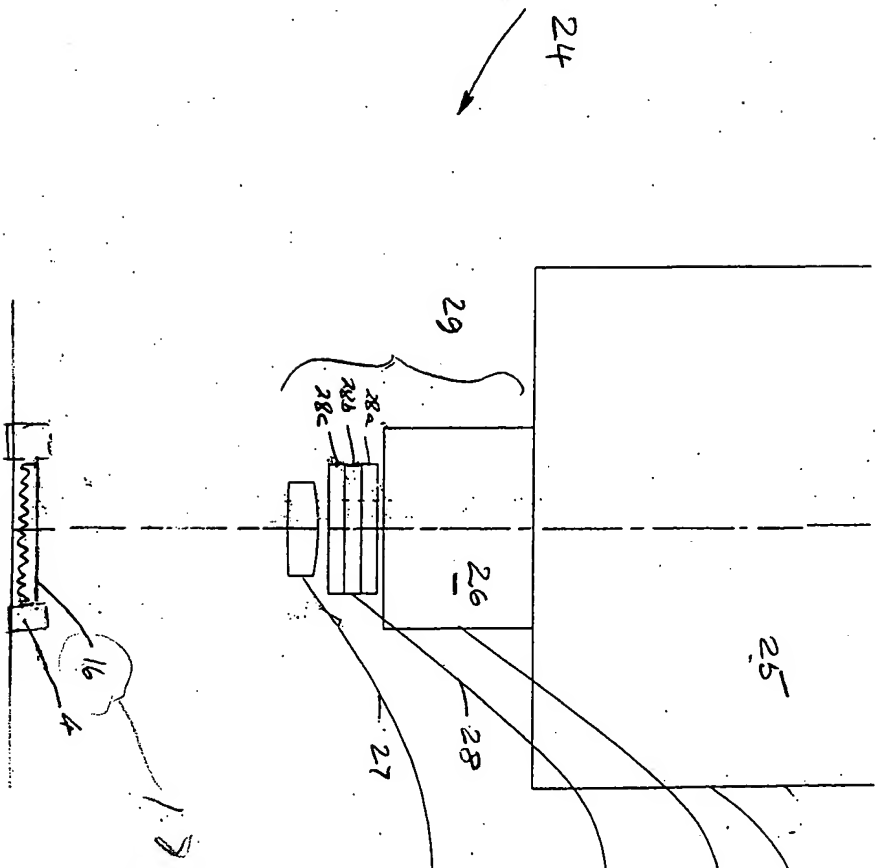

24
29
28a
28b
28c
26
25
28
27
16
4
ROPER SCIENTIFIC (PHOTOMETRICS) COOLSNAPFX MONOCHROME, COOLED CCD CAMERA, 1300 X 1030 PIXELS IN 8.7 X 6.9 MM AREA,
16 MM FOCAL LENGTH, F 1.4 C MOUNT LENS. EDMUND SCIENTIFIC C39-085, IMPLIED CLEAR APERTURE = 11.428 MM DIAMETER
THREE SCHOTT OG570 FILTERS, 3.1 MM THICK, 25.0 MM DIAMETER. TWO A/R COATED ON ONE SIDE. THE THIRD NOT A/R COATED. CEMENTED TOGETHER WITH LENS BOND. A/R COATED: MELLES GRIOT 03FCG489/078, UNCOATED: MELLES GRIOT 03FCG489,
NOTE: TO HAVE ONLY ONE SIDE COATED ONE MUST REFERENCE A QUOTATION NUMBER WHICH I AM IN THE PROCESS OF GETTING.
50 MM FOCAL LENGTH ACHROMATIC DOUBLET, FOR IMAGING OF AREA THAT IS (50/16) TIMES THE CCD AREA, = 21.56 BY 27.22 MM. MELLES GRIOT 01LAO059/078,

FIG 1A

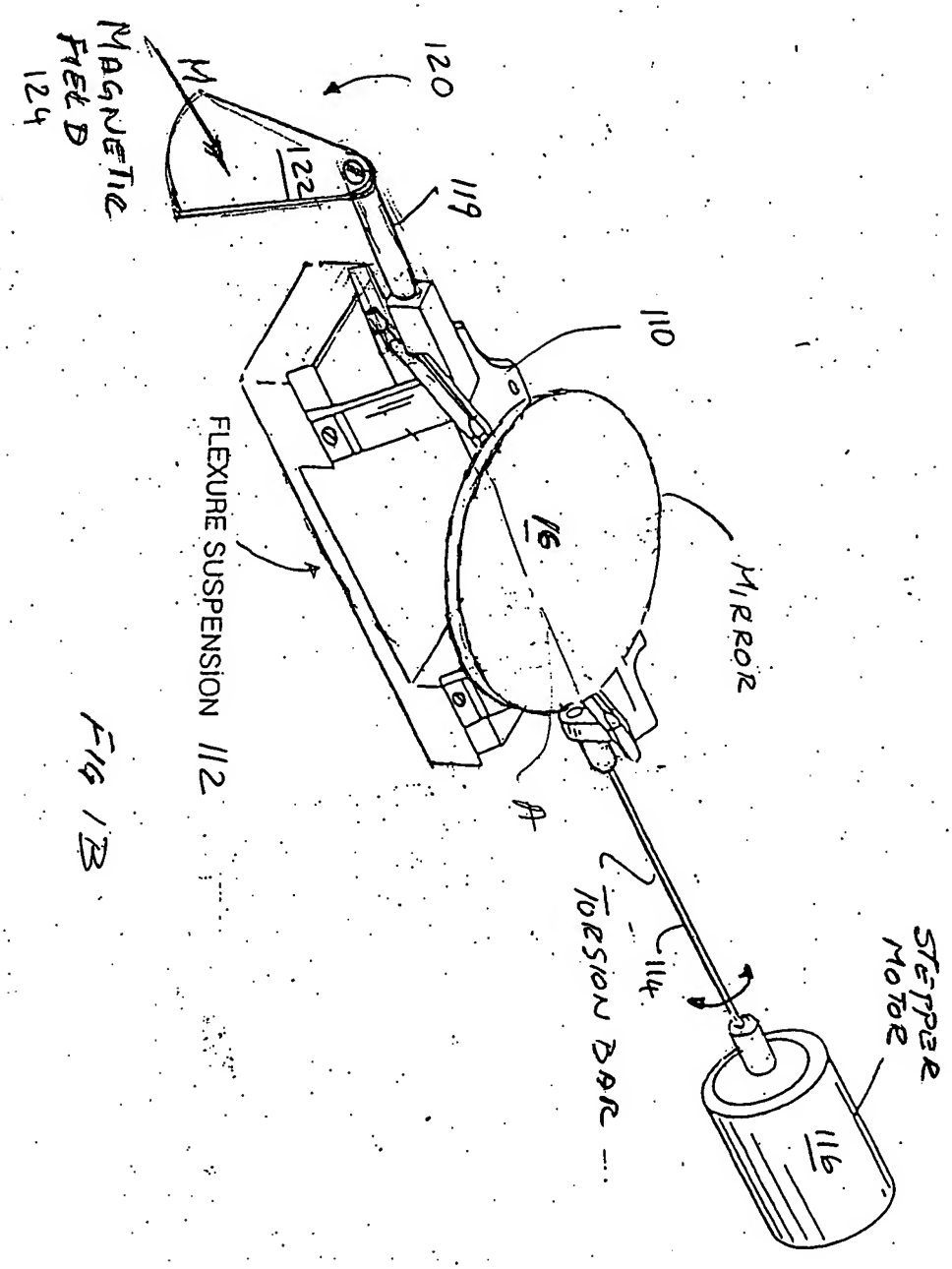

MAGNETIC FIELD
124
M
120
122
119
110
16
MIRROR
FLEXURE SUSPENSION 112
A
114
TORSION BAR
STEPPER MOTOR
116
30

FIG 1B

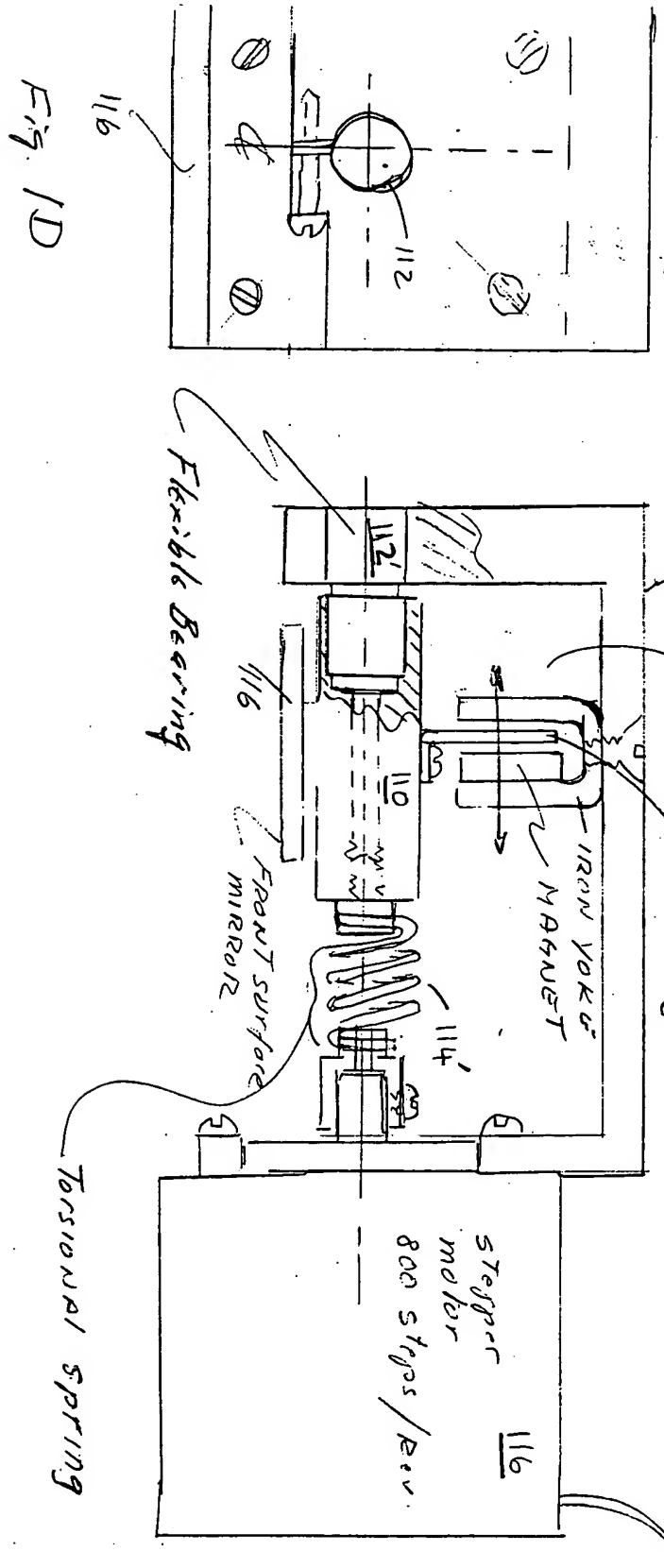

116
112
Flexible Bearing
112'
120
116
110
122 damping blade
IRON YOKE
MAGNET
FRONT SURFACE MIRROR
114'
Torsional spring
Stepper motor 800 steps/rev.
116
30

Fig. 1D

Fig. 1C

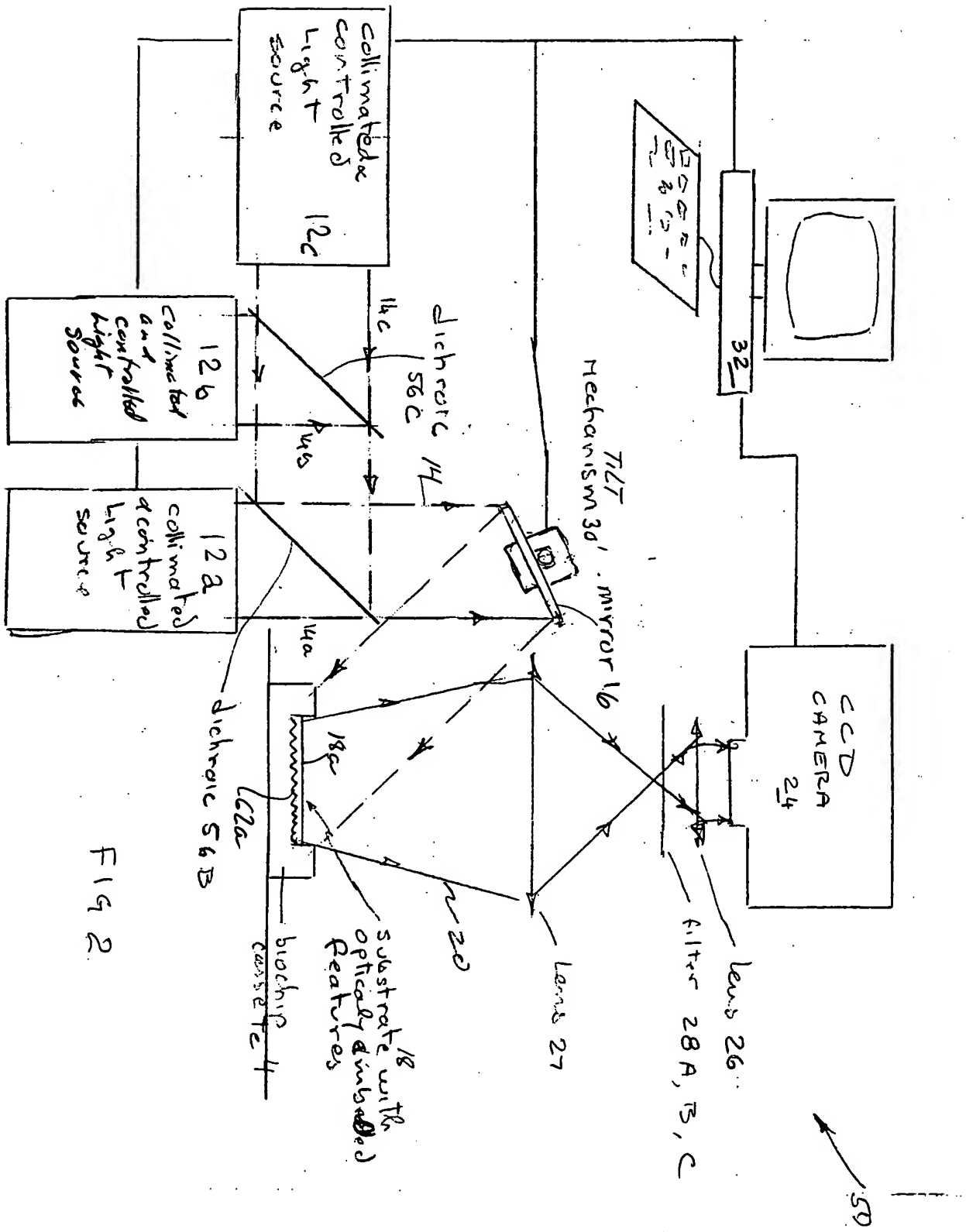

collimated controlled light source 12c
12b collimated and controlled light source
12a collimated controlled light source
dichroic 56c
14c
14
14a
dichroic 56b
TILT mechanism 30
mirror 16
18c
22a
20
substrate with optically detectable features
18
biochip cassette
Lens 27
filter 28A, B, C
lens 26
32
CCD CAMERA 24
50

FIG 2

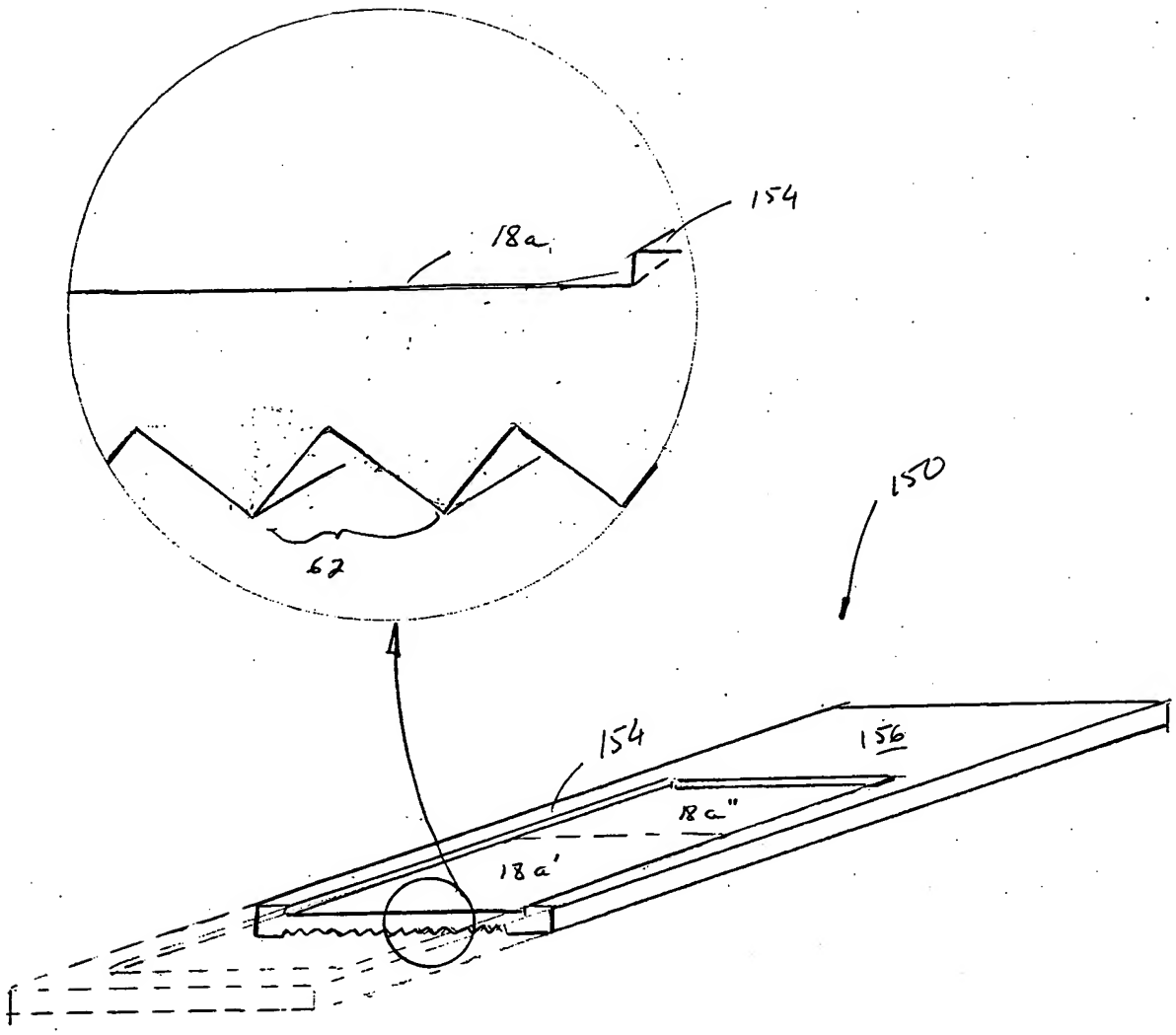


FIG 3

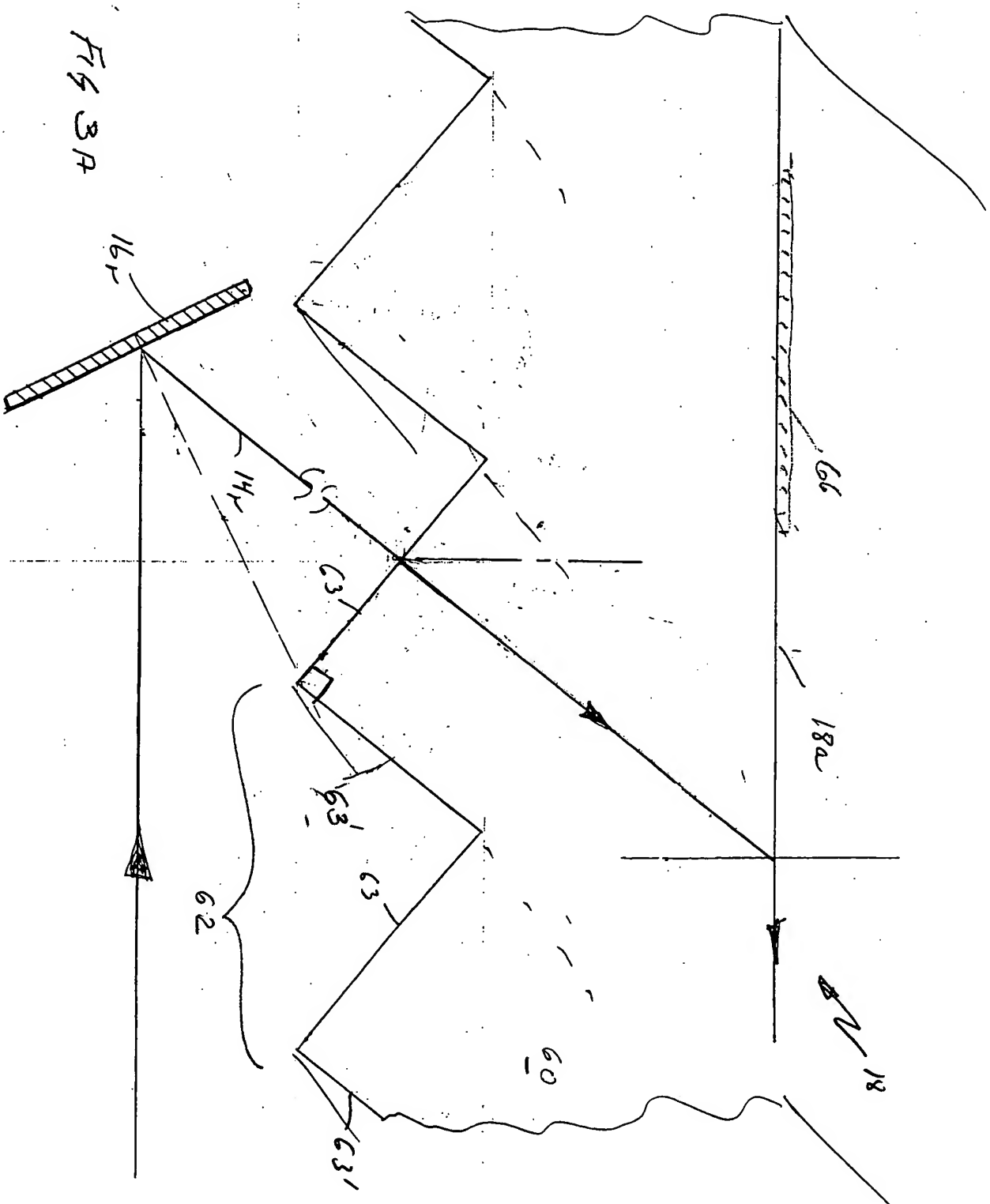


Fig 3A
19r
14r
C3
63
C3
62
C3
60
66
18a
18

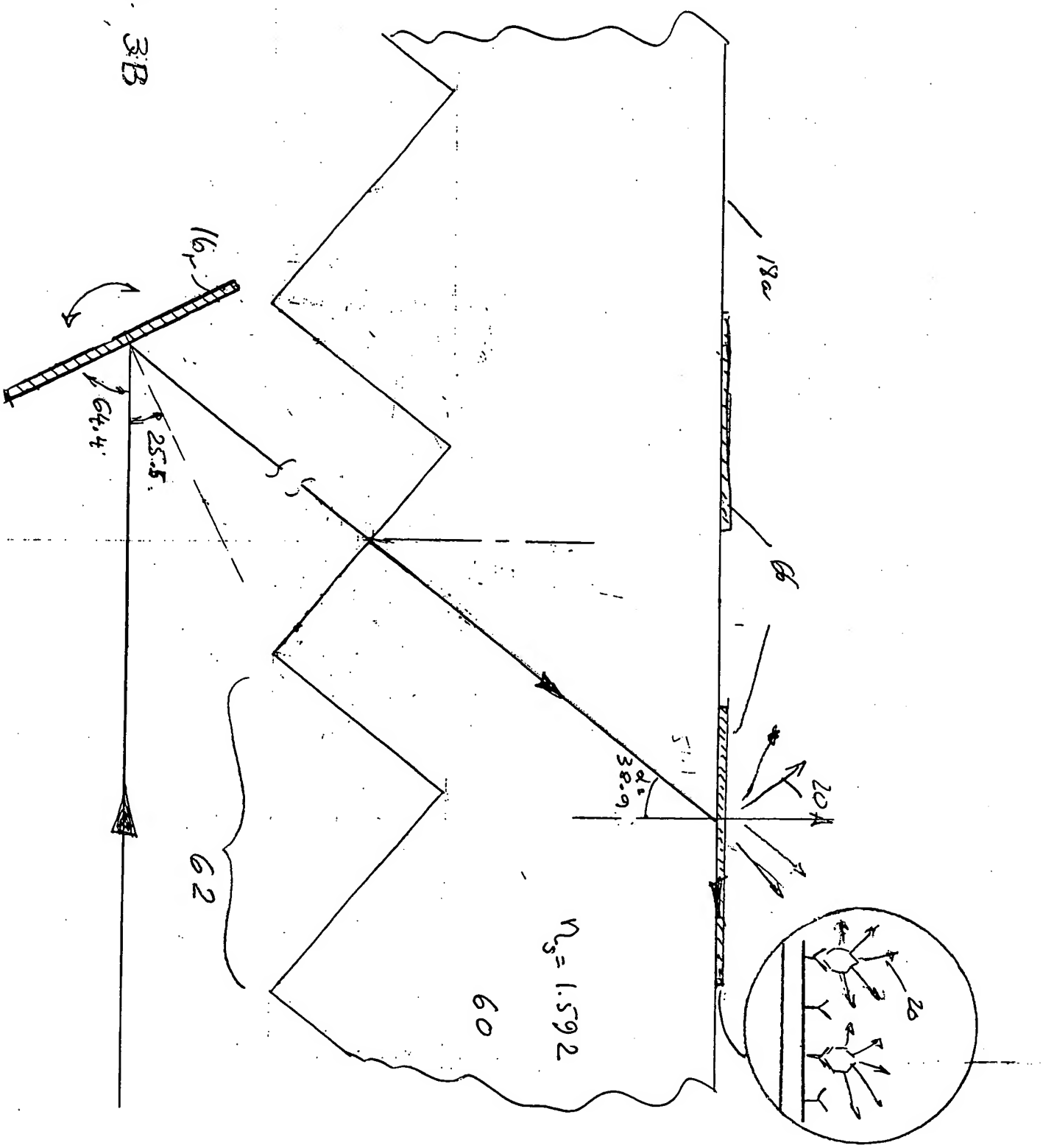


FIG. 3B
16
64.4°
25.5°
18a
B
20A
θ=
38.9
62
n_s= 1.592
60
20

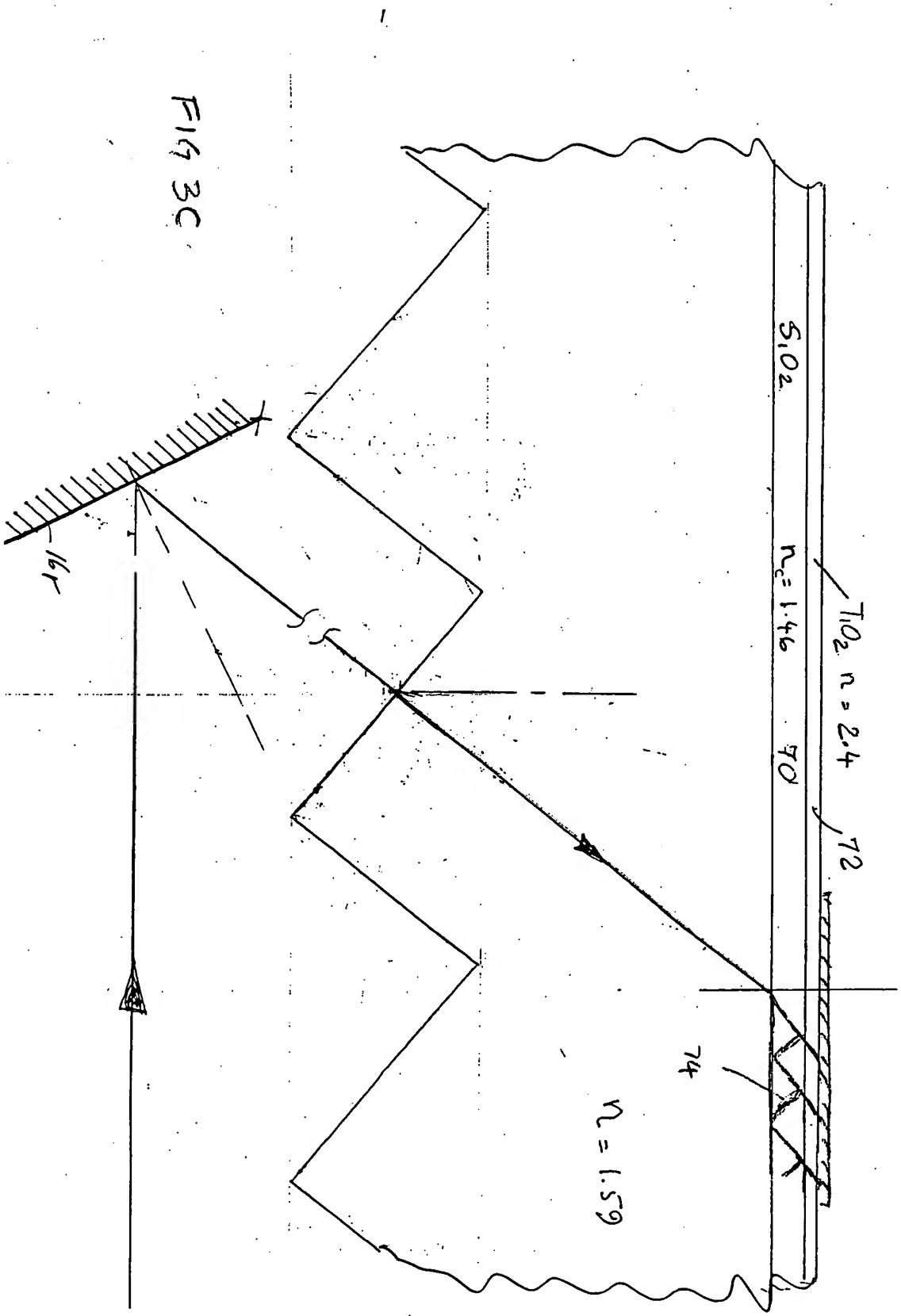


FIG 3C
191
SiO2
nc = 1.46
70
TiO2 n = 2.4
72
74
n = 1.59

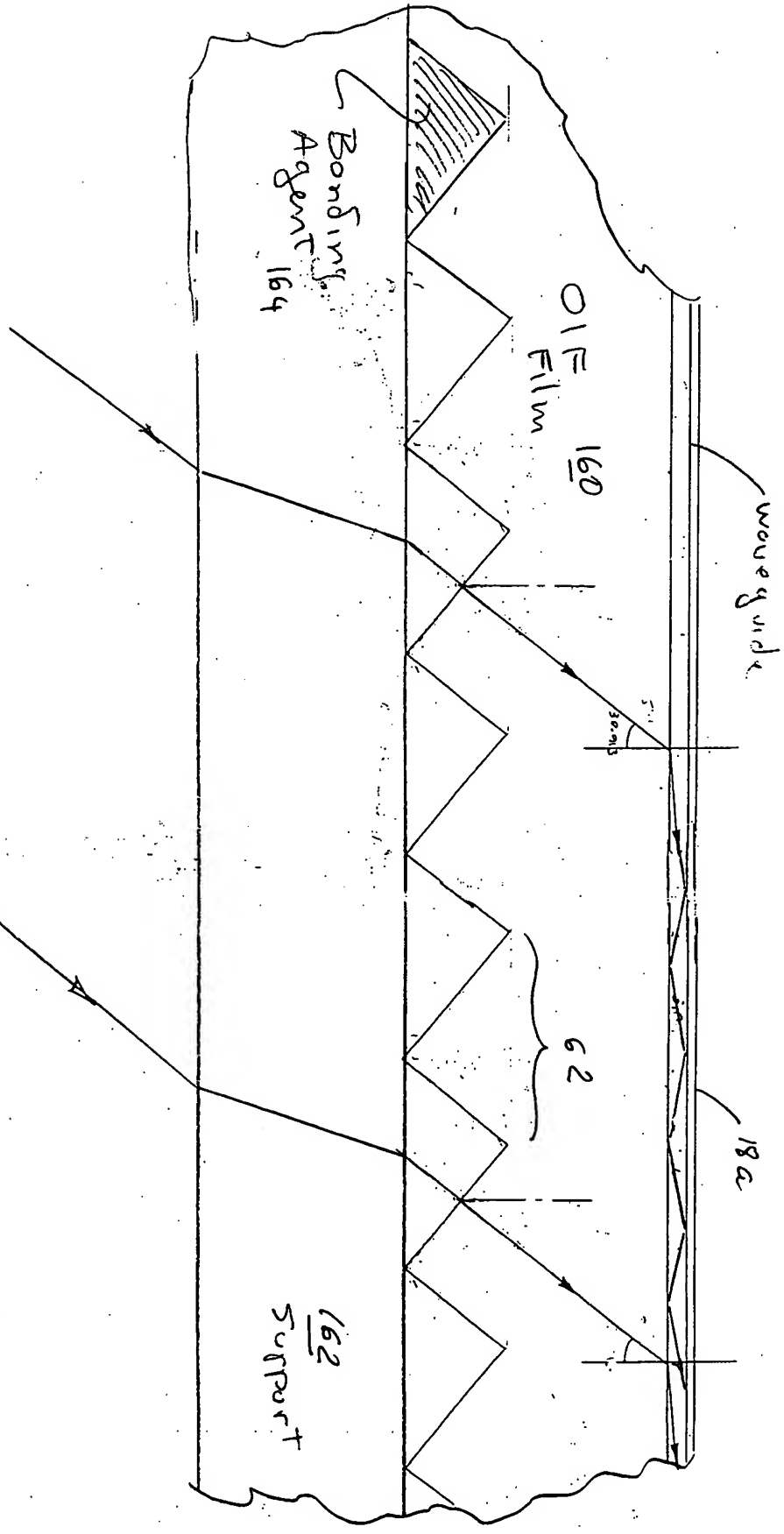
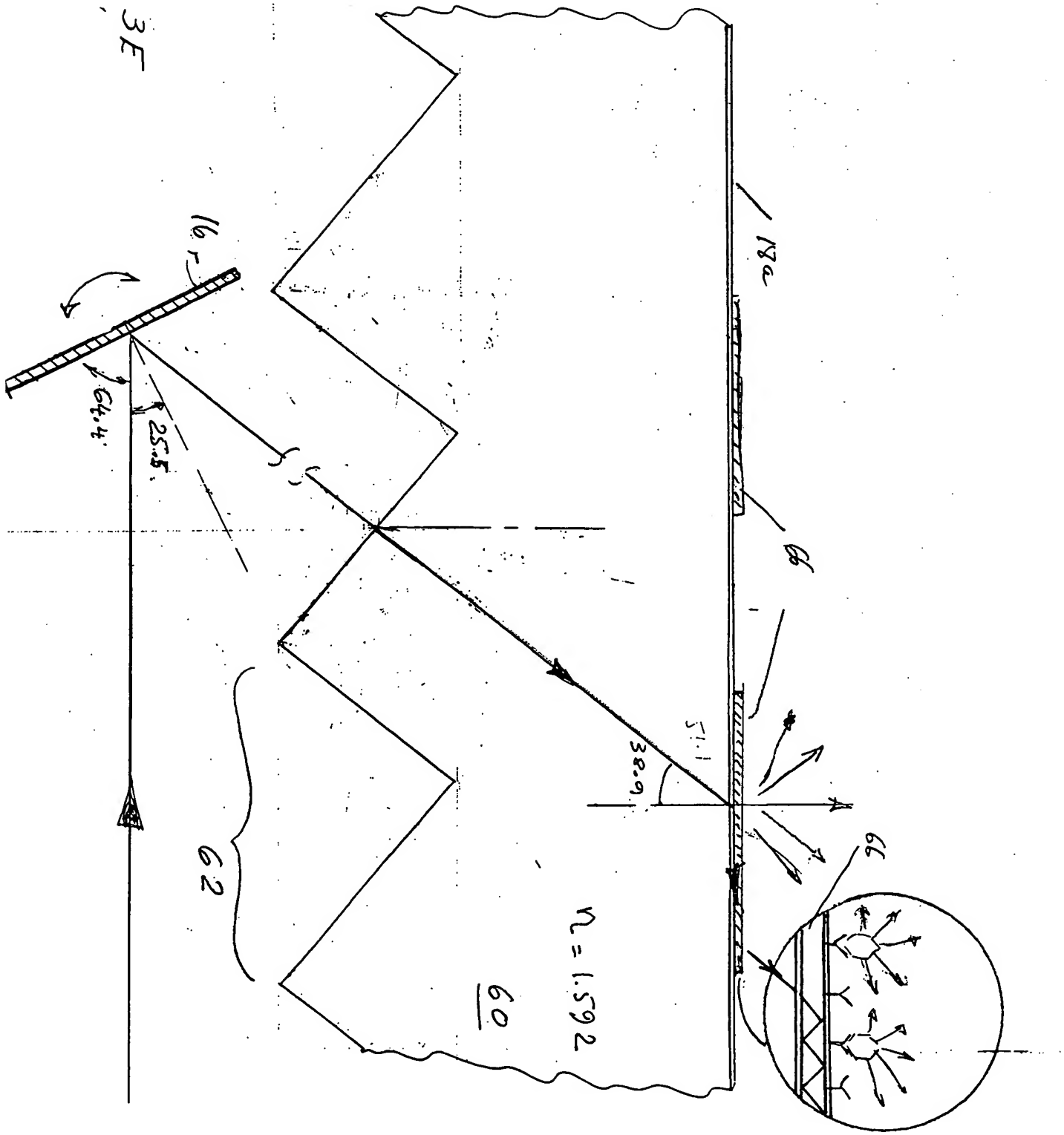


FIG. 3D

FIG. 3E



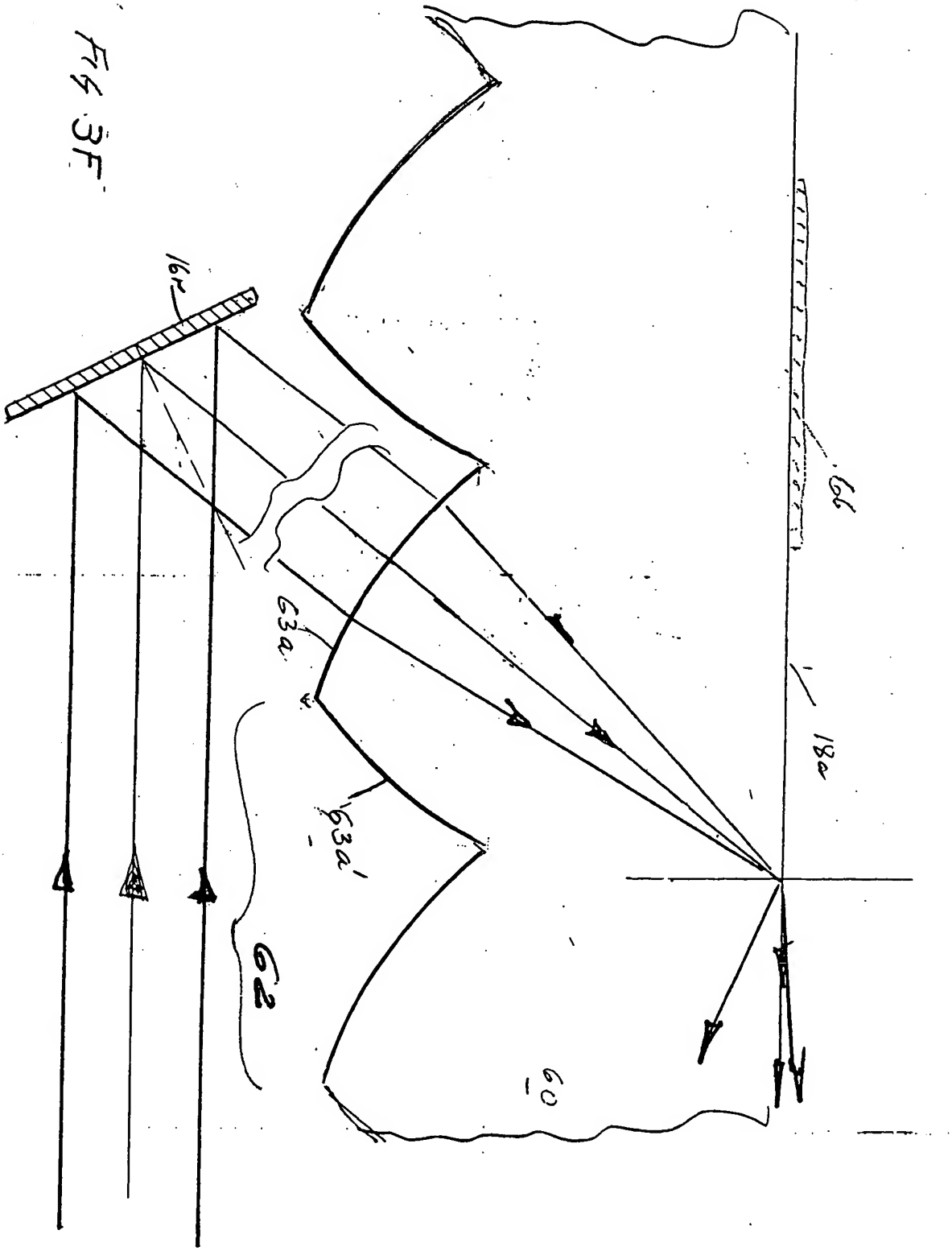


FIG. 3F
16r
66
63a
18a
63a'
62
60

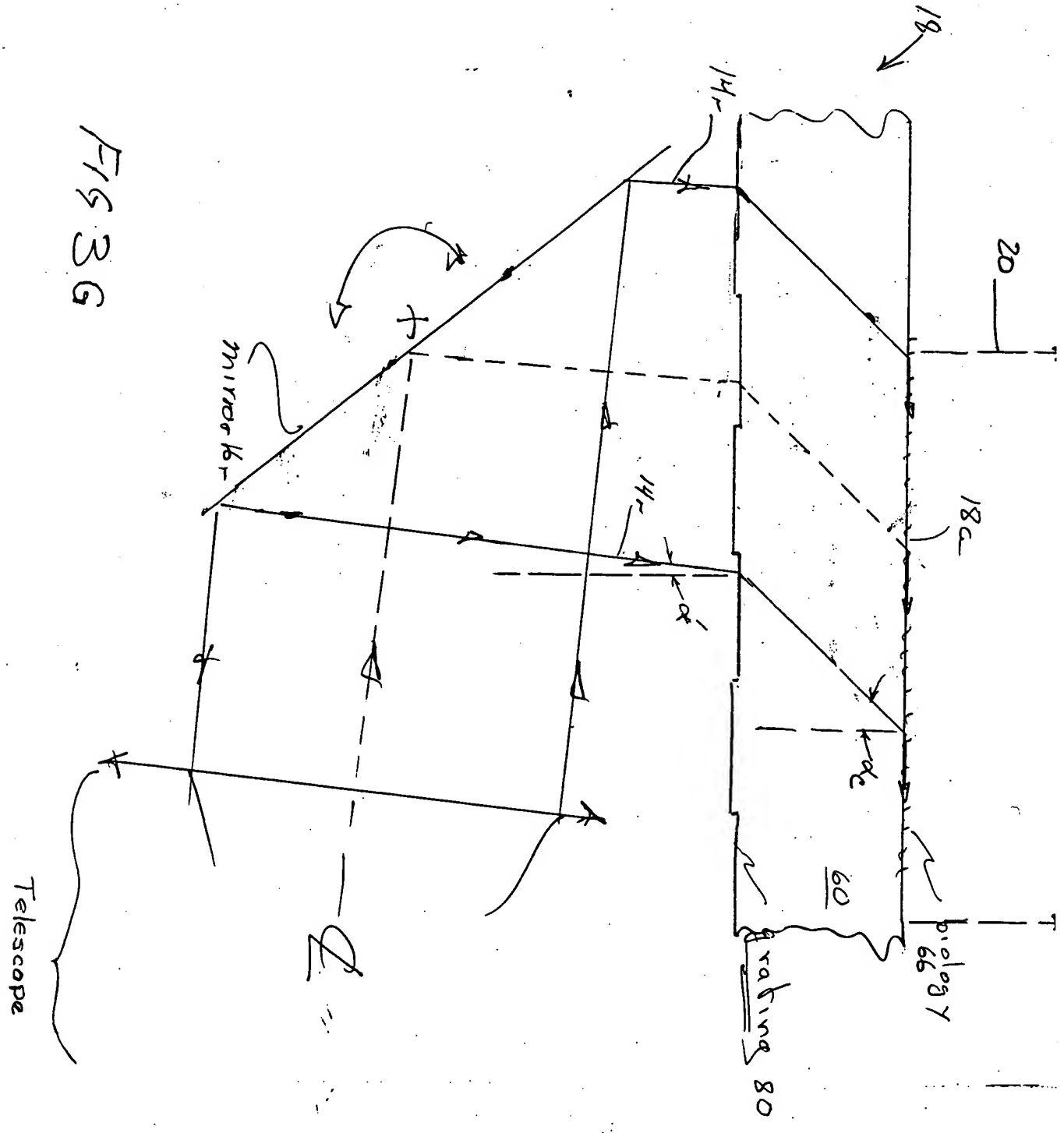

Telescope
Z
Mirror 62
14
14
18c
20
60
Biology 66
Fabrication 80

Fig 3G

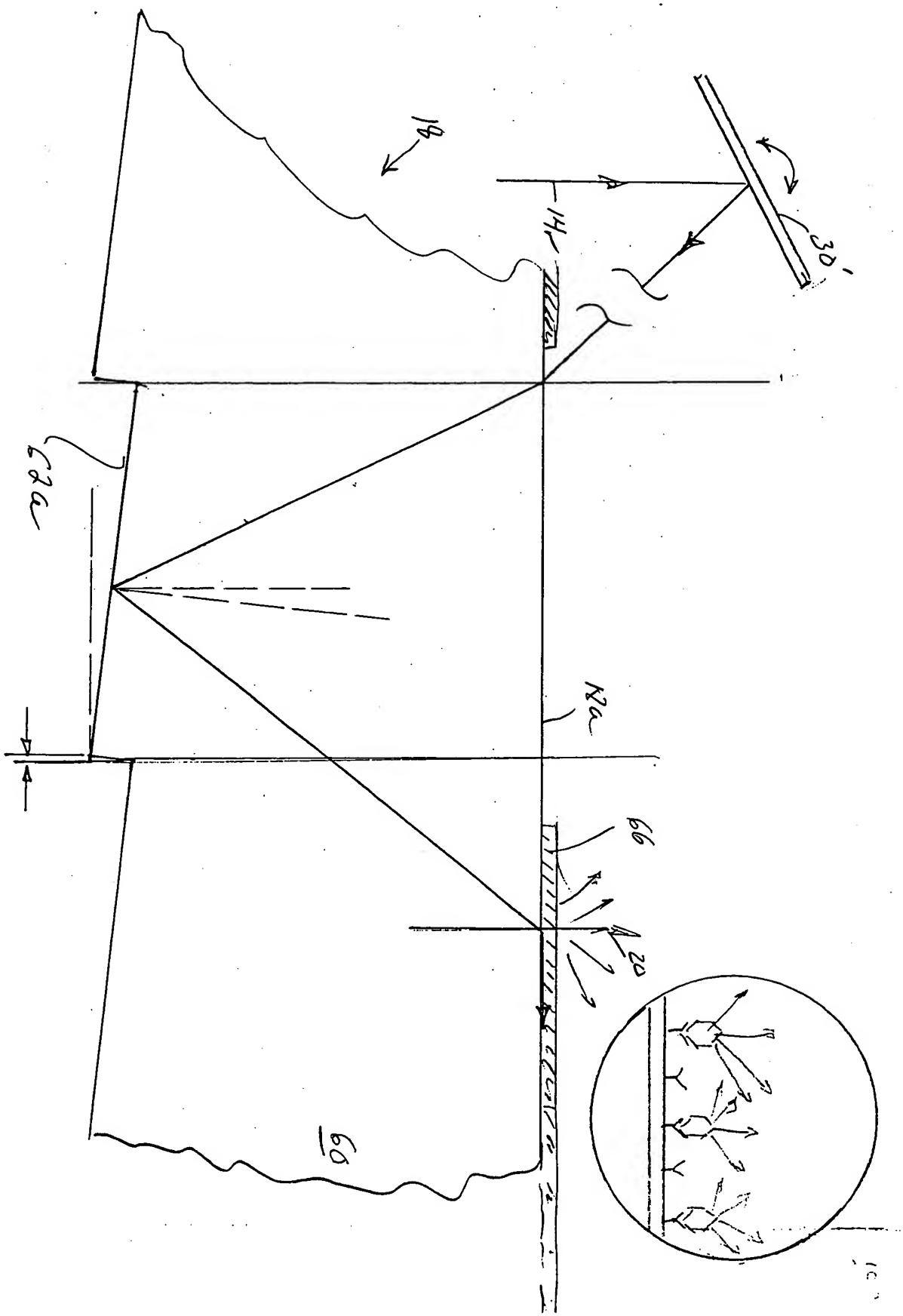


FIG. 4

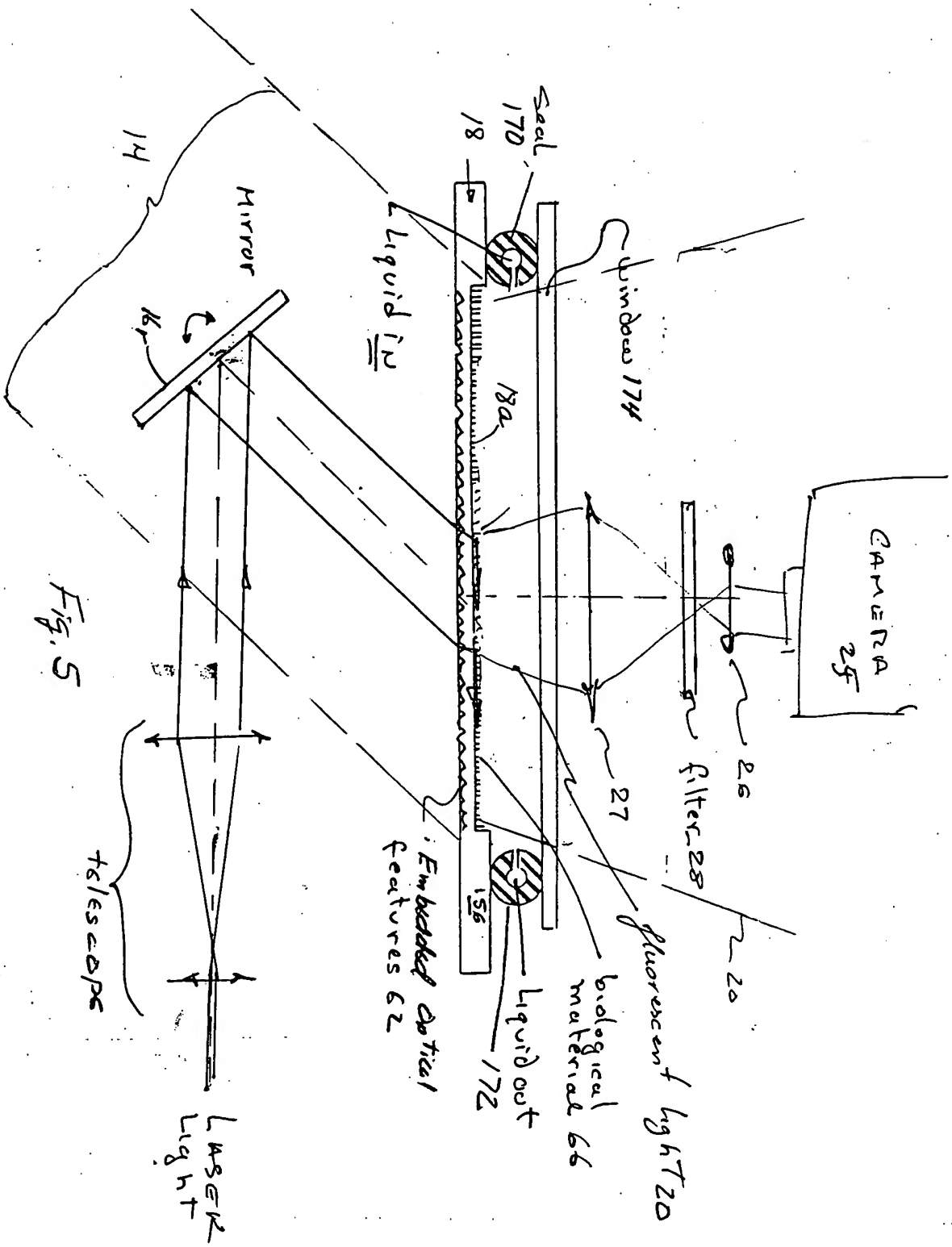

14
Mirror
16
Liquid in
Seal
170
18
18a
Window 174
CAMERA
25
filter 28
26
20
27
fluorescent light
biological material 66
Liquid out
172
156
Embedded optical features 62
telescope
Laser Light

Fig. 5

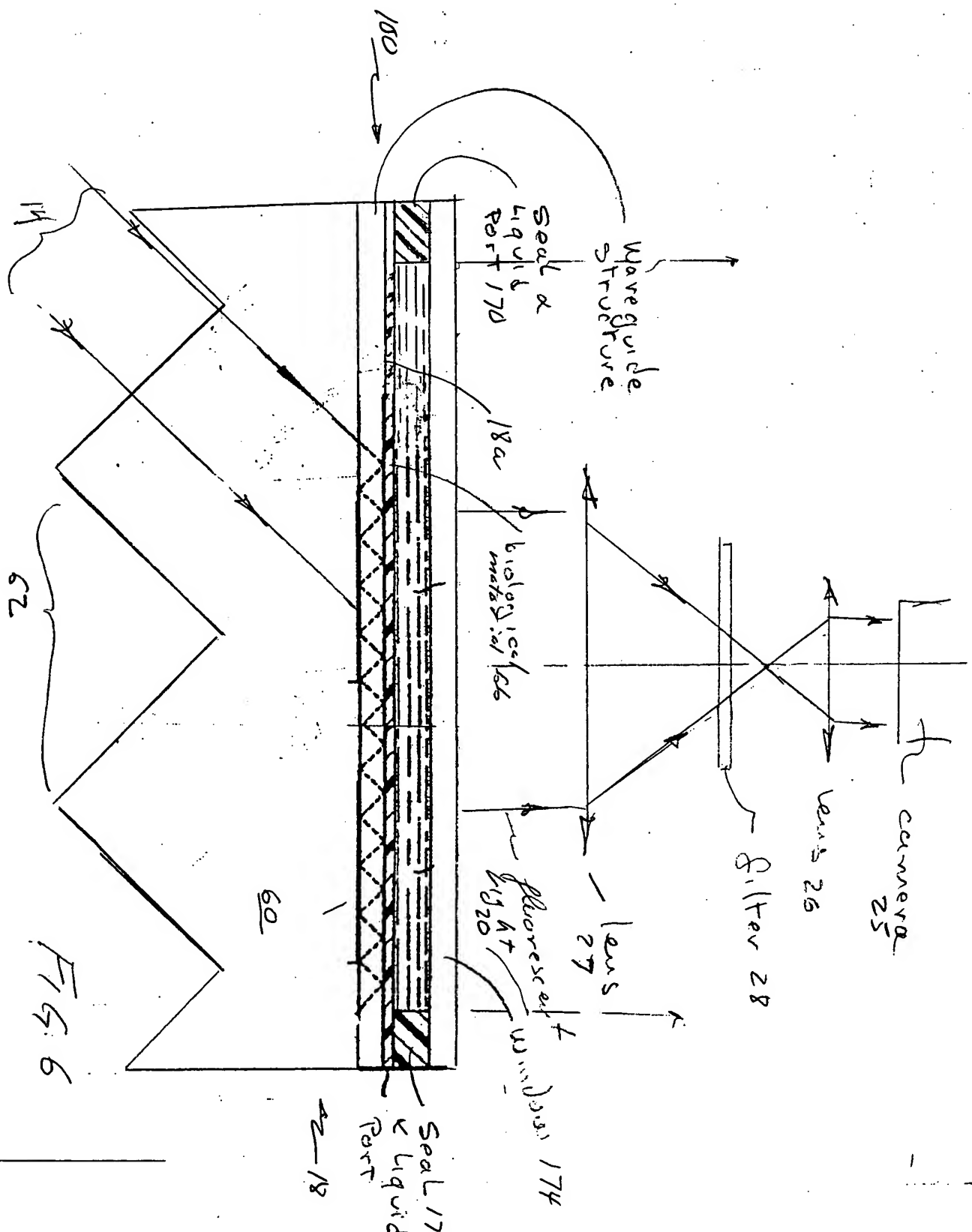

100
Seal & Liquid Port 170
Waveguide Structure
18a
biological material
Fluorescent Light 220
Seal 172 & Liquid Port
18
174
lens 27
filter 28
lens 26
camera 25
29
60
14

Fig. 9

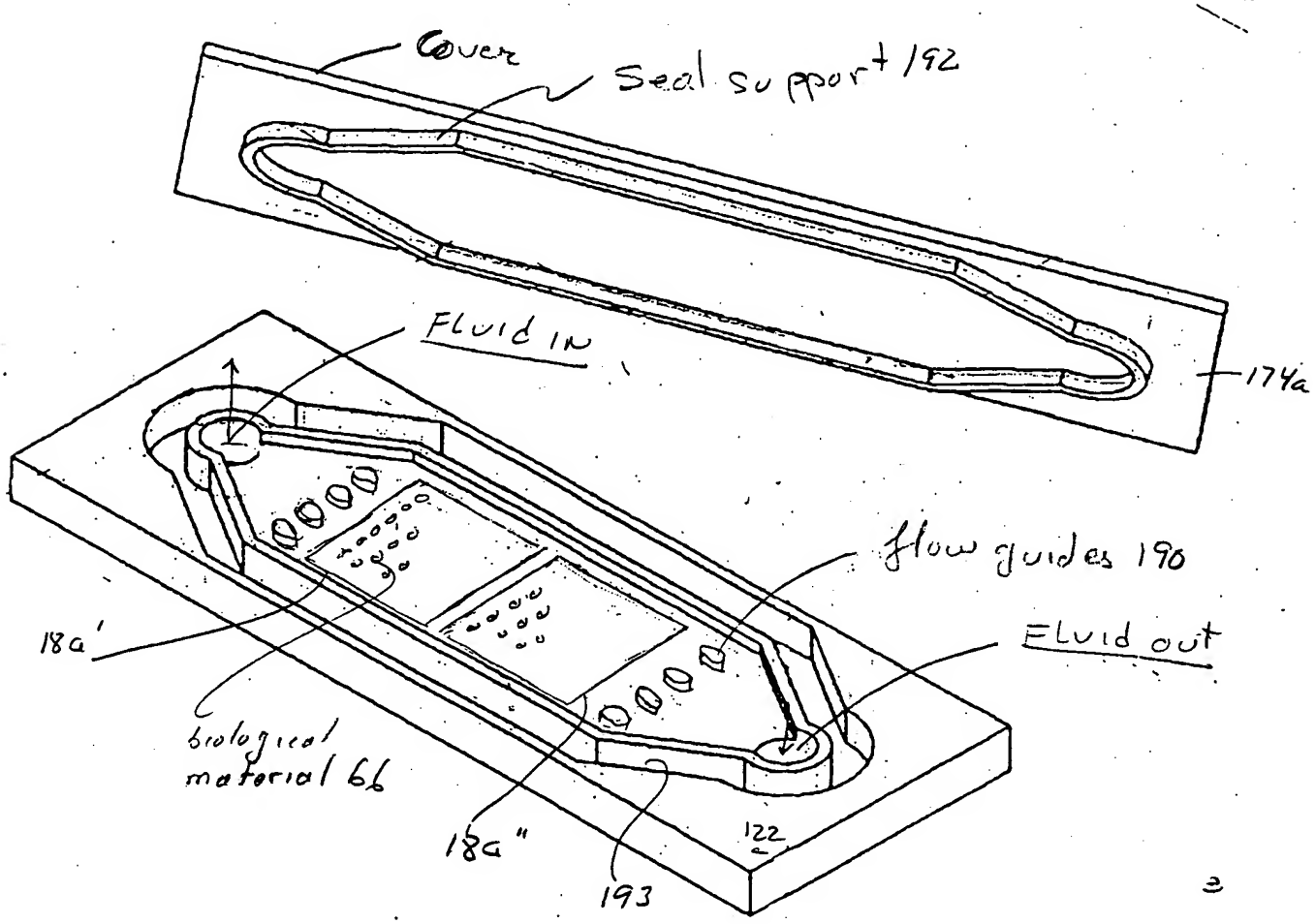

Cover
Seal support 192
Fluid IN
174a
flow guides 190
Fluid out
18a'
biological material 66
18a"
193
122

FIG 6A

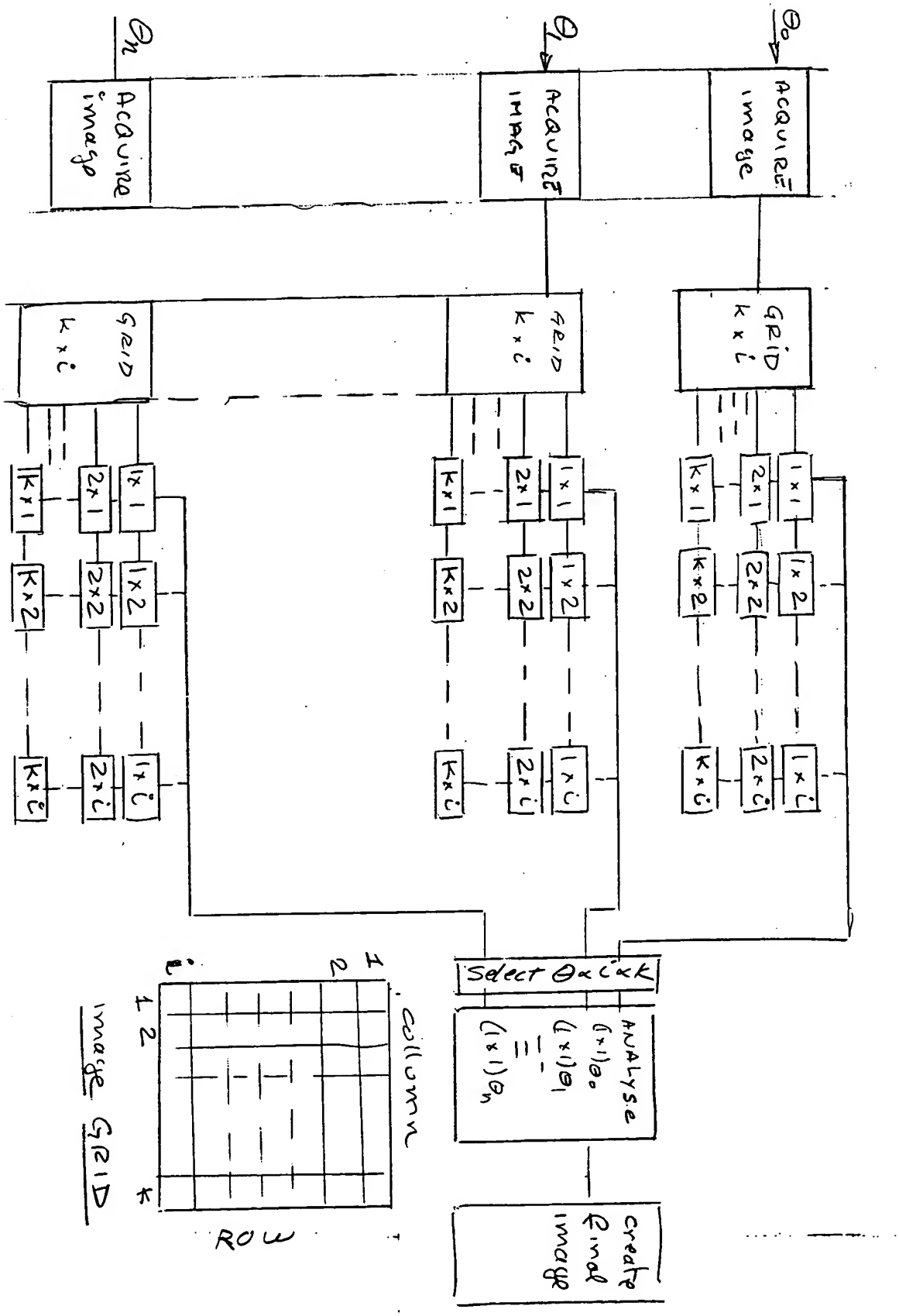


FIG 7

Image analysis flow DIAGRAM

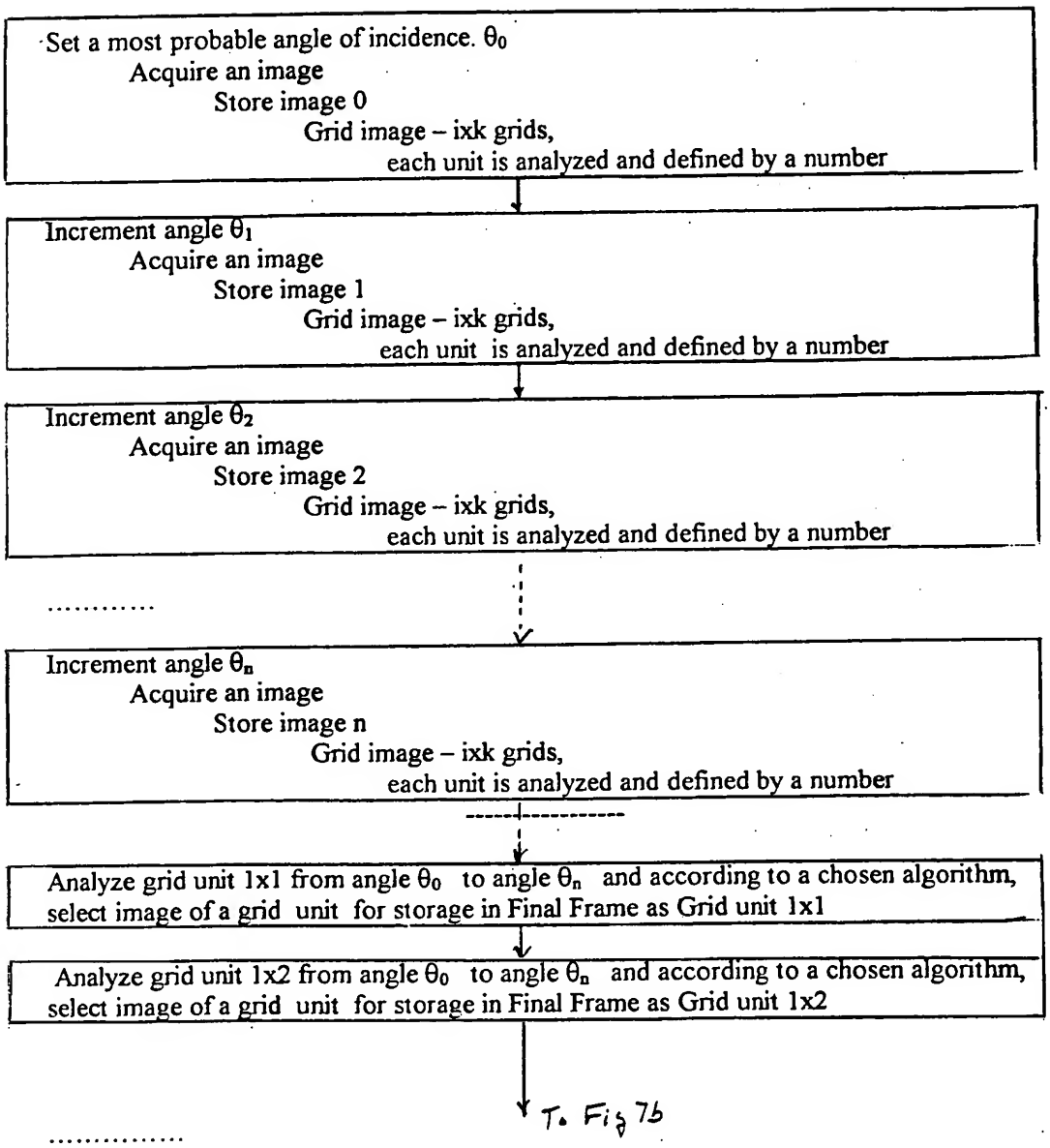

Set a most probable angle of incidence. θ_0
Acquire an image
Store image 0
Grid image – ixk grids,
each unit is analyzed and defined by a number
Increment angle θ_1
Acquire an image
Store image 1
Grid image – ixk grids,
each unit is analyzed and defined by a number
Increment angle θ_2
Acquire an image
Store image 2
Grid image – ixk grids,
each unit is analyzed and defined by a number
.....
Increment angle θ_n
Acquire an image
Store image n
Grid image – ixk grids,
each unit is analyzed and defined by a number
Analyze grid unit 1x1 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 1x1
Analyze grid unit 1x2 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 1x2
T. Fig 7b
.....

Fig 7a

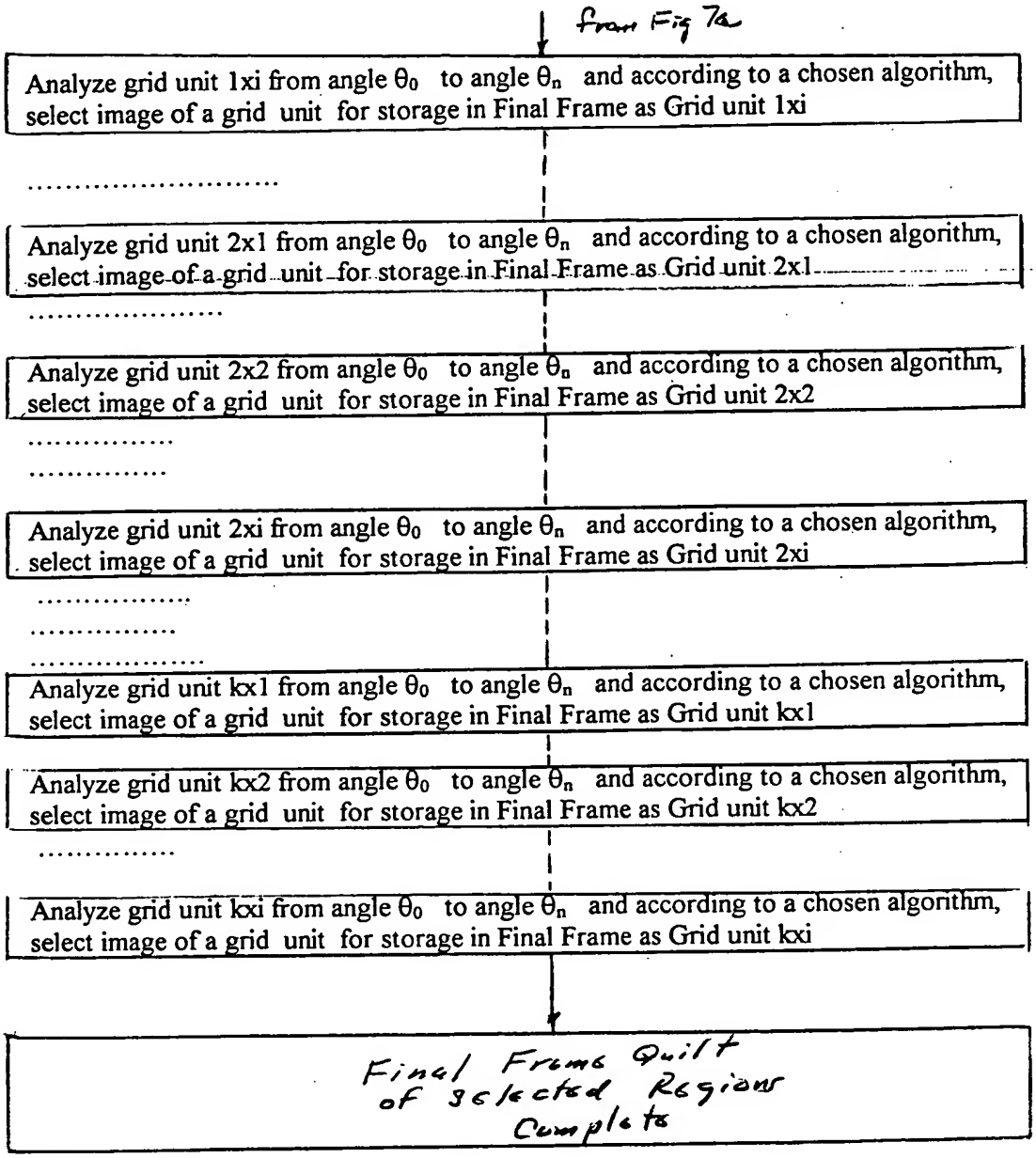
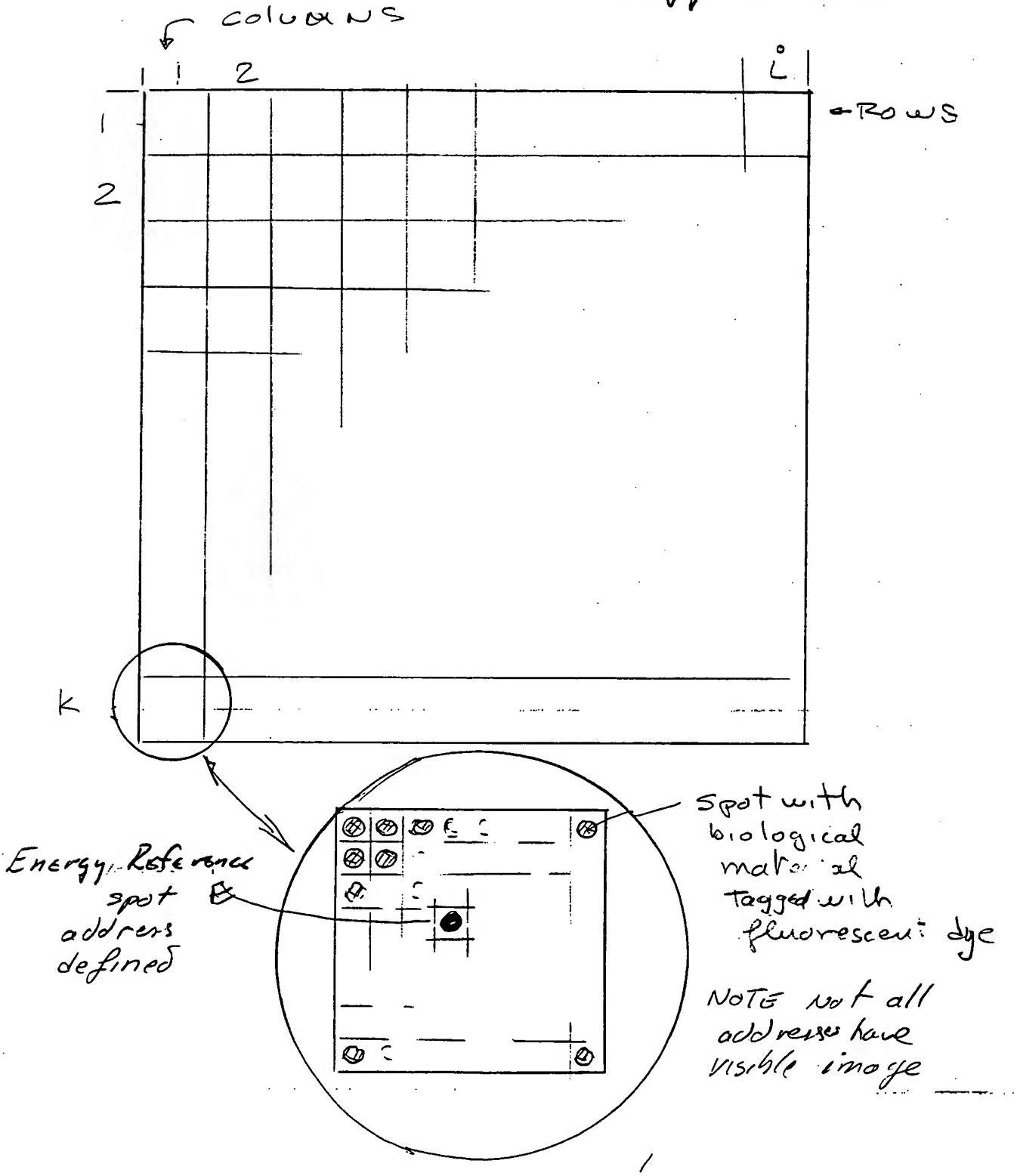

from Fig 7a
Analyze grid unit 1xi from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 1xi
Analyze grid unit 2x1 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 2x1
Analyze grid unit 2x2 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 2x2
Analyze grid unit 2xi from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit 2xi
Analyze grid unit kx1 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit kx1
Analyze grid unit kx2 from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit kx2
Analyze grid unit kxi from angle θ_0 to angle θ_n and according to a chosen algorithm, select image of a grid unit for storage in Final Frame as Grid unit kxi
Final Frame Quilt of Selected Regions Complete

Fig 7b

FIG 8 of spotted array with GRID & SUB GRID & Energy Reference



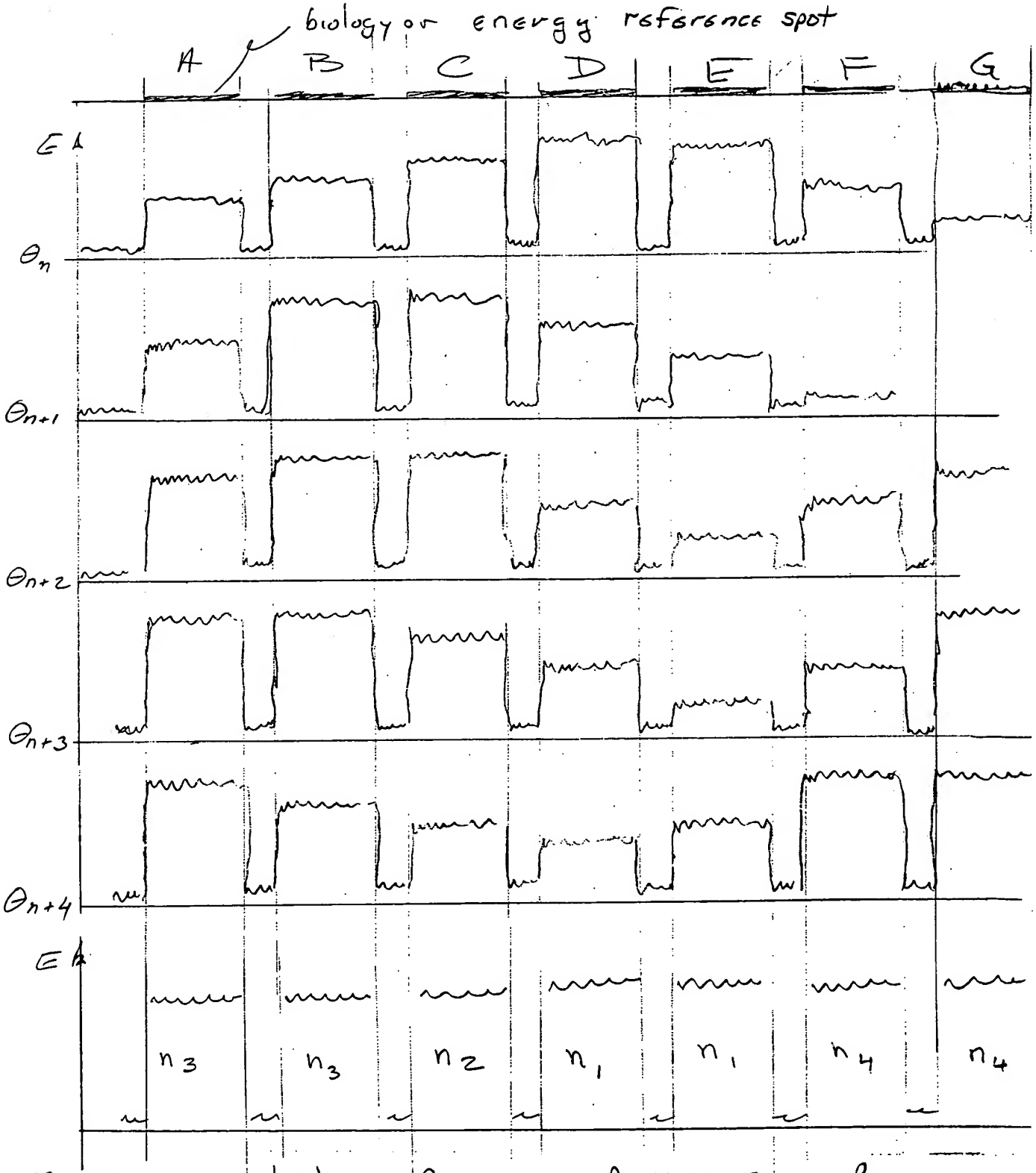


Fig 9 Selection of Region of Max signal as angle θ_n changes To θ_{n+4}

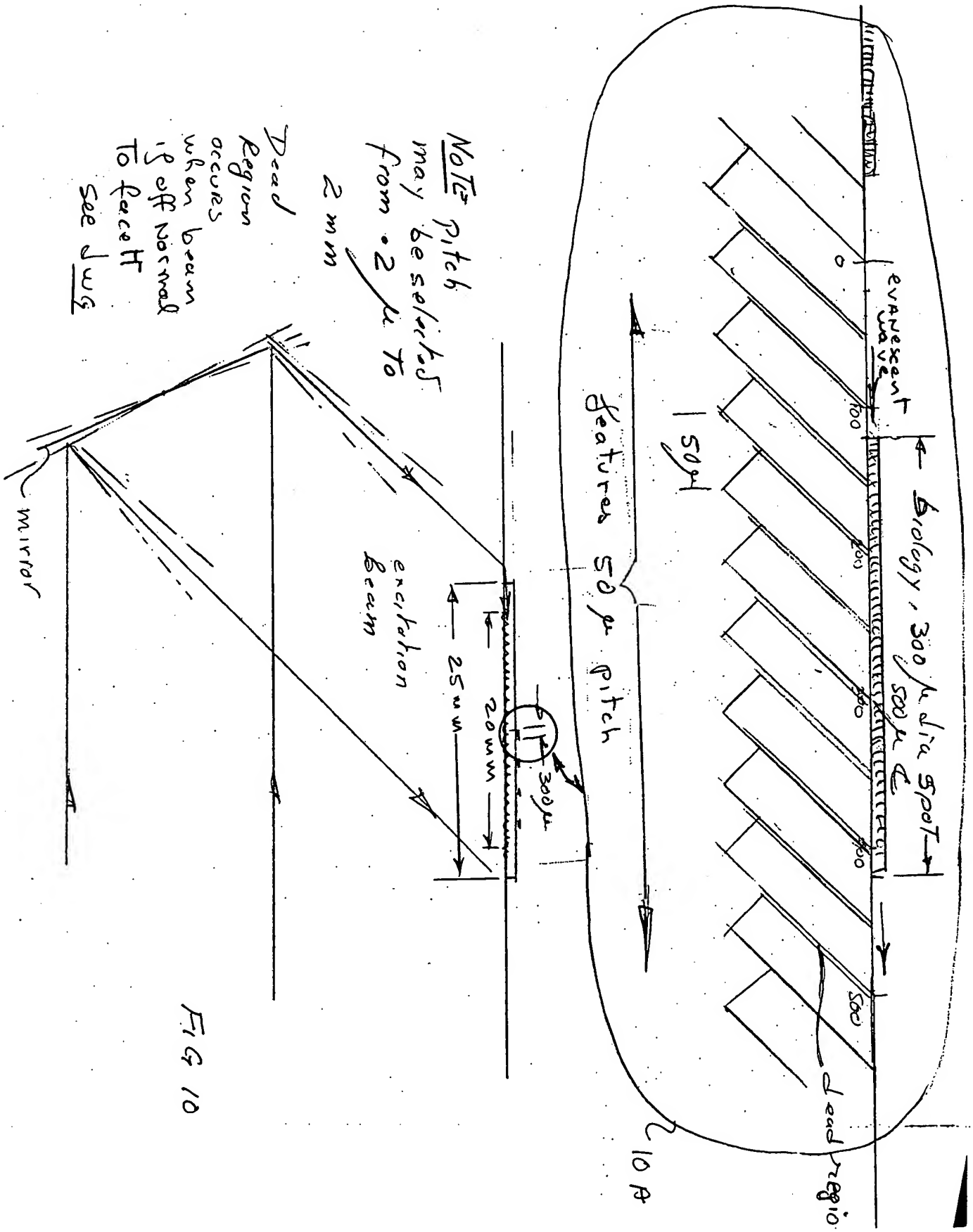
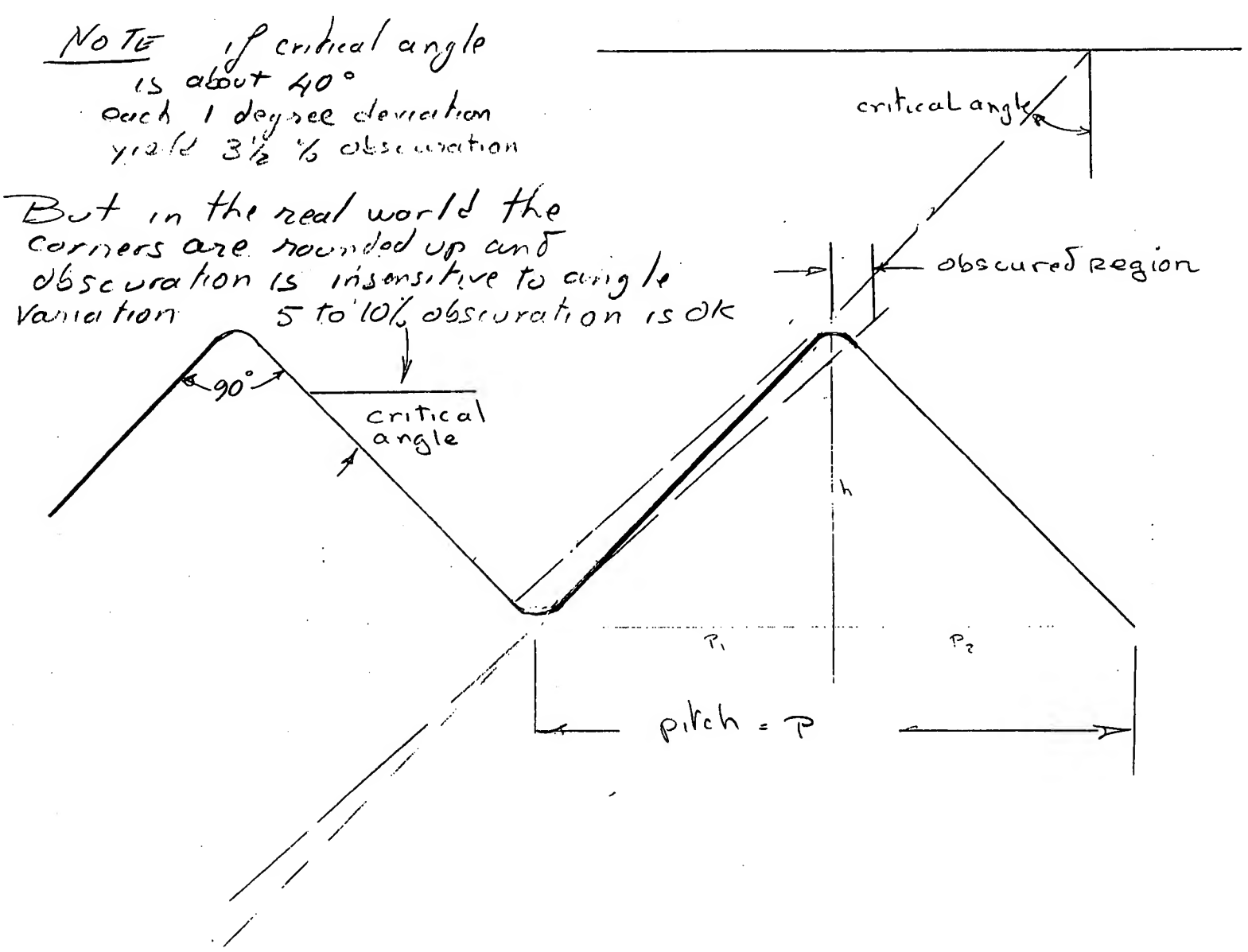

Biology, 300 μ dia Spot
500 μ c
evanescent wave
0
100
200
300
400
500
dead region
10 A
50 μ
features 50 μ pitch
300 μ
20 mm
25 mm
excitation Beam
mirror
Dead Region occurs when beam is off Normal To face H
See dwg
NOTE pitch may be selected from .2 μ To 2 mm

FIG 10

FIG 10 B


NOTE if critical angle
is about 40°
each 1 degree deviation
yield 3½ % obscuration
But in the real world the
corners are rounded up and
obscuration is insensitive to angle
variation 5 to 10% obscuration is OK
90°
critical
angle
critical angle
obscured region
h
P1
P2
pitch = P